IN THE CLAIMS:

1. (Previously presented) A method for surface hardening a steel coil spring of a suspension system comprising the steps of:

determining a type of steel used in the steel coil spring;

selecting a nitriding potential based on the type of steel; and

regulating the nitriding potential in a nitriding atmosphere, wherein the nitriding potential controls a tendency of nitrogen to be absorbed by said steel coil spring.

2. (Previously presented) The method as recited in claim 1 wherein the step of regulating said nitriding potential further includes monitoring at least one process parameter, wherein the nitriding atmosphere is regulated based on said at least one process parameter.

3. (Previously presented) The method as recited in claim 1 wherein the regulating step includes the step of introducing ammonia into said nitriding atmosphere, wherein an amount of the ammonia is selected based on the nitriding potential.

4. (Original) The method as recited in claim 1 further comprising the steps of:

cleaning said surface of said coil spring;

heating said coil spring; and

cooling said coil spring.

5. (Original) The method as recited in claim 4 wherein the step of heating said coil spring includes heating said nitriding atmosphere to a temperature between 380°C and 480°C.

6. (Previously presented) The method as recited in claim 1 wherein the selecting step comprises selecting the nitriding potential that produce a diffusion zone having a thickness between 30 μm and 100 μm in the coil spring.

7. (Previously presented) The method as recited in claim 1 wherein the nitriding potential is selected to form a compound layer on a surface of said coil spring.

8. (Previously presented) The method as recited in claim 1 further comprising the step of shot peening a surface of said coil spring.

9. (Previously presented) The method as recited in claim 8 wherein the step of shot peening said surface of said coil spring includes first shot peening said surface of said coil spring with a .8 mm diameter shot and then secondly shot peening said surface of said coil spring with a .3 mm diameter shot.

10. (Previously presented) A method for surface hardening a steel coil spring of a suspension system comprising the steps of:

cleaning said surface of said coil spring;

heating said coil spring;

determining a type of steel used in the steel coil spring;

selecting a nitriding potential based on the type of steel;

regulating the nitriding potential in a nitriding atmosphere , wherein the nitriding potential controls a tendency of nitrogen to be absorbed by said steel coil spring;

controlling said step of regulating said nitriding potential with a computer;

cooling said coil spring; and

shot peening a surface of said coil spring.

11. (Previously presented) A steel coil spring of a suspension system comprising:

a steel body portion having a surface; and

a diffusion zone produced by nitriding said surface by regulation of a nitriding potential in a nitriding atmosphere, wherein the nitriding potential has a value corresponding to a type of steel in the steel coil spring.

12. (Previously presented) The coil spring as recited in claim 11 wherein said surface is nitrided by introducing ammonia into the nitriding atmosphere, wherein an amount of the ammonia is selected based on the nitriding potential.

13. (Previously presented) The coil spring as recited in claim 11 wherein the nitriding atmosphere is heated to a temperature between 380°C and 480°C.

14. (Previously presented) The coil spring as recited in claim 11 wherein said diffusion zone has a thickness between 30 μm and 100 μm.

15. (Previously presented) The coil spring as recited in claim 11 wherein said coil spring further includes a compound layer having a thickness between 0 and 2 μm.

16. (Previously presented) The method as recited in claim 1 wherein the step of regulating said nitriding potential is controlled by a computer.

17. (Previously presented) The method as recited in claim 4 where in the step of cleaning said surface of said coil spring includes employing hydrochloric acid.

18. (Previously presented) The method as recited in claim 3 wherein the regulating step comprises introducing the ammonia into said nitriding atmosphere for 3 to 8 hours.

19. (Previously presented) The method as recited in claim 1 wherein said steel coil spring includes aluminum.

20. (Previously presented) The method as recited in claim 10 wherein the step of cleaning said surface of said coil spring includes employing hydrochloric acid.

21. (Previously presented) The method as recited in claim 10 wherein the regulating step comprises introducing the ammonia into said nitriding atmosphere for 3 to 8 hours.

22. (Previously presented) The method as recited in claim 10 wherein said steel coil spring includes aluminum.

23. (Previously presented) The method as recited in claim 11 wherein said steel coil spring includes aluminum.